

## Clinical profile, etiology and Management of Hydropneumothorax in a tertiary care hospital in Kolkata – a pilot study

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### Abstract

**Introduction** – Hydropneumothorax is an abnormal presentation of both air & fluid in the pleural spaces. Even though the knowledge of hydropneumothorax dates back to ancient Greece, not many cases are documented in national & international journals.

**Aim** – To study the clinical presentation, etiological diagnosis and management of patients of hydropneumothorax.

**Materials & Methods** – patients admitted in a tertiary care hospital in Kolkata between January 2019 and January 2020 were prospectively studied. Detailed history and clinical examination were recorded. Blood, pleural fluid, sputum examinations and Computed Tomography (CT) scan of thorax were done. Intercostal drainage (ICD) was inserted and patients were followed up for 3 months.

**Results** – 60 patients were studied. Shortness of breath (SOB), chest pain & cough were the most common presenting symptoms. Tachypnea and Hypoxemia was present in all patients. All patients have exudative pleural effusion. Etiological diagnosis was possible in 50 patients. Tuberculosis (TB) in 60% of cases, acute bacterial infection in 20% of cases, Obstructive airways diseases in 20% cases and no malignant lesions. All patients required ICD tube drainage. Mean duration of in-situ ICD was 24.8±13.1 days.

**Conclusion** – Most patients presented with SOB, cough, chest pain. Pleural fluid analysis was essential for etiological diagnosis. TB found to be the most common etiology. ICD with antibiotics is the common treatment/management for long duration.

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### I. Introduction

Hydropneumothorax is an abnormal presentation of both air & fluid in the pleural spaces. The knowledge of hydropneumothorax inferred as early as fifth century BC by physicians in ancient Greece who practiced so called Hippocratic succusion of the chest (1) in which a splashing sound is produced by the rocking the patient to and fro. The purpose of this study is to determine the clinical presentation, etiological diagnosis and management of patients of hydropneumothorax.

### II. Materials & Methods

A prospective, non-randomized, observational hospital based study was carried out for a period of one year from January 2019 to January 2020 in the pulmonary medicine department of a tertiary care hospital in Kolkata. Patients with hydropneumothorax diagnosed clinically and confirmed radiologically were recruited in the study. 60 patients were studied in this pilot trial. Traumatic and iatrogenic hydropneumothorax cases were excluded from the study. Detailed history and clinical examination of the recruited patients were carried out. Symptomatic history regarding Shortness of breath (SOB), fever, cough, chest pain and constitutional symptoms like loss of appetite, loss of weight were documented. History of comorbid illness specially diabetes, hypertension, ischemic heart diseases (IHD), Tuberculosis (TB) and any immunocompromised/immunosuppressive disorders were also collected in detail. Primary investigations were carried out to obtain baseline values. Arterial Blood Gas analysis (ABG), Complete Blood count (CBC), Random blood sugar (RBS), serum protein and sputum for Acid fast bacilli (AFB) by Ziehl-Neelsen (ZN) &

Rhodamine auramine stain were sent. Pleural fluid were sent for routine microscopical examination along with protein, sugar, lactate dehydrogenase (LDH), Adenosine deaminase (ADA) & cholesterol estimation. Pleural fluid sample also tested for microbiological examination like bacterial & fungal culture & sensitivity and BACTEC culture. Contrast enhanced computed tomography (CECT) of chest done before ICD. Patients were followed up for 3 months with weekly ICD status and Chest X-ray findings. ICD tube was clamped and removed when leakage of air stopped, drainage of fluid reduced to 50 ml/day or less and chest X-ray shows complete lung expansion. Collected data were statistically analyzed by SPSS software version 17.0.

### III. Result

60 patients of hydropneumothorax were recruited in the study. Mean age of presentation was  $48.7 \pm 25$  years. 54 out of 60 were males (90%). Breathlessness (90%) was the most common presenting symptoms followed by cough & fever seen in 80% of patients and chest pain in 70% of patients. Loss of weight & appetite was present in few patients (?). Table 1 shows the distribution of presenting symptoms.

**Table 1.** Presenting symptoms of the patients

Symptoms	% of patients
Fever	80
Cough	90
Chest pain	70
Resp.distress	90
Anorexia	90
Weight Loss	70
Polyurea	10
Haemoptysis	30

History of pulmonary TB was present in 20 patients (33.33%). Smoking history was present in 50% of patients. Diabetes as well as hypertension were present in 10% of patients. Hypoxemia was present in 50 patients (83.33%). Sputum for AFB was positive in 30% of patients. Pleural fluid biochemistry revealed protein 4.3 gm/dl and glucose 40 mg/dl on an average of all cases. Based on Light's criteria, all patients had exudative pleural effusion. 30% cases, pleural fluid showed polymorphic predominance in 30% cases and rest (70%) showed lymphocytic predominance. CT scan was done for definitive exclusion of parenchymal & pleural pathology. Table 2 enumerates CT scan abnormalities.

**Table 2.** CT scan features/abnormalities

CT findings	No. of patients
Cavity	15
Consolidation	15
Emphysema	5
Pleural nodules	10
Insignificant	15

**Table 3.** Etiology of pneumothorax

Etiology	% of patients
TB	60
COPD & bacterial	20
Diabetes	10
Primary pneumothorax	10
Malignancy & Iatrogenic	0

All patients were treated with ICD tube. Mean duration of ICD tube in situ was 2 weeks. Majority of patients had complete resolution between 15 days and 30 days. 18 patients had ICD for more than 30 days and these patients had TB with Broncho-Pleural Fistula (BPF) in 30% cases

### IV. Discussion

Hydropneumothorax is a common entity in this country. Majority of patients presents with cough, fever and chest pain due to pleural involvement and respiratory distress arising from ventilation perfusion mismatch. In our study, TB is the commonest etiology. The findings of the study corroborate with study by Gupta et. al. (2) and Javaid et. al. (3) where respiratory distress is the most common presenting symptom. In our study, pleural fluid for AFB was positive in 15% patients which correlated with the study by Heydarman (4). In this study, TB is the most common because of rupture of the TB foci or cavitory lesion. Light originally developed Light's criteria to explain all exudative effusion. Pleural fluid ADA have high accuracy (5) in determining pleural TB and done routinely. CT scan was done to rule out pleuropulmonary involvement in our country (6) because TB is most common as in this study showed 60% of patients having TB. Among 60 patients recruited in the study, 2

patients were referred to Cardiothoracic & Vascular surgery (CTVS) for trapped lung and broncho-pleural fistula and prolonged air-leak.

### **V. Conclusion**

This study showed that most patients presented with chest pain, respiratory distress, cough & fever. Extensive pleural fluid analysis, Chest X-ray, sputum microscopy and CT scan were done. TB is the most common etiology. ICD was required in every patient along with Anti TB Drugs (ATD) with antibiotics for prolonged duration. Further research required to devise better management protocol along with more accurate determination of antibiotic regimen & course.

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